

1030-35-33

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*Optimal regularity near sonic line for regular shock reflection.*

We consider a class of solutions of shock reflection problem for potential flow, which includes solutions constructed by G.-Q. Chen and M. Feldman for the case of reflection by large-angle wedges. For such solutions, we prove  $C^2$  regularity in the subsonic region up to the sonic line away from the shock, and show that this implies that second derivative of solution has a jump across the sonic line. We also study regularity near the point of intersection of the sonic line with the shock. (Received June 25, 2007)